REMARKS

In view of the above amendments and following remarks, reconsideration of the rejections contained in the Office of October 23, 2007 is respectfully requested.

It is initially noted that the Examiner's rejection of claim 33 has been rendered moot by the cancellation of the claim, without prejudice or disclaimer of the subject matter therein.

It is also noted that the above amendments propose to amend claim 30 to recite that the step of detecting vacuum pressure decrease of one of the nozzles, relative to a vacuum pressure to be achieved at a time of picking up a component by the one of the nozzles, occurs after the one of the nozzles has passed over a component recognition device. This amendment is proposed at this time, i.e. after Final Rejection, because it was not earlier deemed necessary. It is believed that claim 30, in its form without the above proposed amendment, distinguishes over the cited patent to Scholten et al., whether or not it is taken in further consideration of Cameron. However, the above amendment may help to address any concerns that the Examiner has regarding the applicability of the prior art. This will be discussed in detail below.

The method according to claim 30, it should be noted, recites the use of nozzles connecting to a single vacuum generating device to perform component pick up operations. A system using a plurality of nozzles to perform component pick-up operations using a common vacuum generator has difficulty in making an accurate judgement with prior systems, because the vacuum level that is to be achieved after completion of the component pick up operation can vary over a wide range, depending on the variety of suction conditions. The variation in vacuum pressure comes from the fact that when one of the nozzles fails to pick up a component, air leakage occurs at that nozzle. This has a negative impact on the vacuum pressure at all of the other nozzles. For example, in the case where a nozzle having a large opening drops a component, or if a plurality of nozzles drop their components, the influence of the vacuum leakage would be so large that the suction power at the other nozzles could deteriorate, even with a sufficient vacuum pressure being supplied. So in the case where the variance of the vacuum pressure because of air leakage is large, it may not be possible to make an accurate judgement

that a component is lost from a determination upon an absolute value of the vacuum pressure, as opposed to one that is relative to the pressure when the component is picked up.

The Scholten patent employs the generation of an acoustic signal as a detector of the absence of an article at a nozzle; the air flow that is created by the absence of the component being held by the nozzle is converted into the acoustic signal, thus indicating the absence of the article. In the described embodiment of Scholten, the sound generator could be a simple whistle. It could also be a vortex chamber that causes turbulence in the air flow, the turbulence being accompanied by sound and noise. As such, it can be seen that the whistling signal, or the noise created by turbulence, is a result of an absolute pressure being present; the creation of the noise corresponds to a particular pressure, and not a relative pressure.

However, when a plurality of suction nozzles are connected to a single vacuum pressure source, as required by the method of the present invention, if there is a vacuum leak at one nozzle, it can create instability in the vacuum pressure at the other nozzles, even when initially suctioning the components to the nozzles, thus creating variations in the vacuum pressure. Thus, if the absolute vacuum pressure is employed as a threshold, as in the case of Scholten, a proper judgement may not be performed as to whether each of the nozzles has successfully picked up the component in view of the unstable vacuum pressure situation. Thus, Scholten suffers from the same problem as the prior art discussed in the application. Such problem is remedied in the present invention, as defined by claim 30, by detecting the vacuum pressure decrease for one of the nozzles relative to a vacuum pressure that is to be achieved at a time of picking up a component by the nozzle. The detection in Scholten is not relative to the vacuum pressure to be achieved when picking up the component, as it is an absolute pressure. Thus, Scholten does not properly disclose the step of claim 30 of detecting the vacuum pressure decrease relative to the vacuum pressure when picking up the component.

As can for example be seen by the flowchart in Fig. 5, component recognition scanning is performed, and then, as noted by Step 6, after having recognized the component, the achieved vacuum pressure is initialized to zero as a base level for measuring any changes in pressure. This

is another way of saying that the detection of the vacuum pressure is relative to the vacuum pressure that is achieved when picking up the component.

The above proposed amendment to claim 30 emphasizes this aspect of the present invention by reciting that the detecting of the vacuum pressure decrease occurs after the nozzle has passed over the component recognition device. Thus, the component recognition device recognizes the component, and then the detection step takes place; the detection of the pressure relative to the vacuum pressure at that time, with the component in place, provides for a proper base line for the pressure measurement.

Thus with the present invention, a vacuum pressure decrease relative to the vacuum pressure that is achieved when picking up the component is detected. Unstable vacuum pressures, or variations in the vacuum pressure, will not affect the judgement of whether or not the nozzle has been successfully picked up by the component. The threshold that is used in the present invention is not an absolute vacuum pressure, as in Scholten, but a relative vacuum pressure, making the detection operation more accurate. There is no disclosure of this from Scholten.

This detection is performed even after the nozzle passes over the recognition device, and thus more effectively prevents the occurrence of defective substrates as compared with the arrangement of Scholten.

For the above reasons, it is respectfully submitted that claim 30, particularly as now proposed to be amended, patentably distinguishes over Scholten. However, it is submitted and believed that even without the above proposed amendment, claim 30 defines over Scholten. The proposed amendment further emphasizes the nature and operation of the present invention, as discussed above. Thus, claim 30 clearly defines over the prior art which the Examiner has cited.

The remaining references cited by the Examiner do not address the above deficiency of Scholten. As such, no further detailed discussion of these references appears to be warranted at this time.

The Examiner is respectfully requested to enter the above amendment and allow the application as a whole.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance, and the Examiner is requested to pass the case to issue. If the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact Applicants' undersigned representative.

Respectfully submitted,

Takashi MAEDA et al.

By: _____

Nils E. Pedersen
Registration No. 33,145
Attorney for Applicants

NEP/nka
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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